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GEOLOGY, ENERGY, AND MINERAL (GEM) RESOURCE ASSESSMENT OF THE PROSPECT MOUNTAIN GEM RESOURCE AREA (GRA), WYOMING, INCLUDING THE PROSPECT MOUNTAIN WILDERNESS STUDY AREA (WY-030-303)

PHASE I

Contract No. YA-553-CT2-1055

Prepared for:

U.S. Bureau of Land Management

Prepared by:

Tetra Tech, Inc.
Pasadena, California

August 1983

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EXECUTIVE SUMMARY

The U.S. Bureau of Land Management (BLM) has adopted a two-phase procedure for the integration of geologic, energy, and mineral (GEM) resources data concerning Wilderness Study Areas (WSAs). To facilitate this review, certain WSAs with similar geologic environments and mineral characteristics have been grouped together into larger GEM Resource Areas (GRA). Using these guidelines, the Prospect Mountain WSA was combined into the larger Prospect Mountain GRA. This report, which terminates the Phase I activities for the Prospect Mountain GRA, is an evaluation and interpretation of existing data concerning the GEM resource potential of the Prospect Mountain WSA.

The Prospect Mountain GRA contains one WSA, the Prospect Mountain WSA (WY-030-303). The Prospect Mountain WSA is located in the BLM's Medicine Bow Resource Area, Rawlins District, Wyoming.

The Prospect Mountain WSA is considered moderately favorable for the potential occurrence of GEM resources. The area is considered to have a moderate favorability based on direct but quantitatively minimal evidence for the potential occurrence of strategic and critical minerals (classified 3C); these minerals would probably be disseminated in pegmatites and as dissemination beds or veins in the mafic rocks of the Prospect Mountain area. The area is considered to have a moderate favorability based on direct but quantitatively minimal evidence for the potential occurrence of rare earths (classified 3C); rare earths would probably occur as small bodies in pegmatites. The area is also considered to have a moderate favorability based on direct but quantitatively minimal evidence for the potential occurrence of uranium and thorium, and pegmatite minerals (quartz and feldspar) (classified 3C). Uranium and thorium would be associated with the rare earths in pegmatites; quartz, feldspar, and mica also occur as common constituents in the pegmatites. Quantitatively minimal direct evidence exists to support a low favorability classification for the potential occurrence of any other GEM resources (classified 2C). This classification is based in part on the geologic environment and the inferred geologic processes that have been identified in the WSA.

Additional geologic investigations would help supplement the GEM resource evaluation of the Prospect Mountain GRA. Detailed surface geologic and geochemical investigations of the pegmatites and the mafic intrusives in the area should be conducted. These studies would provide valuable information to assist in making wilderness decisions. A moderate amount of geologic information exists that has been reviewed and interpreted which should be reviewed by BLM personnel to gain additional insight into the GEM resource potential of the Prospect Mountain WSA prior to making wilderness decisions.

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GEM RESOURCE AREA
PROSPECT MOUNTAIN

1.0 INTRODUCTION

1.1 Purpose of Study

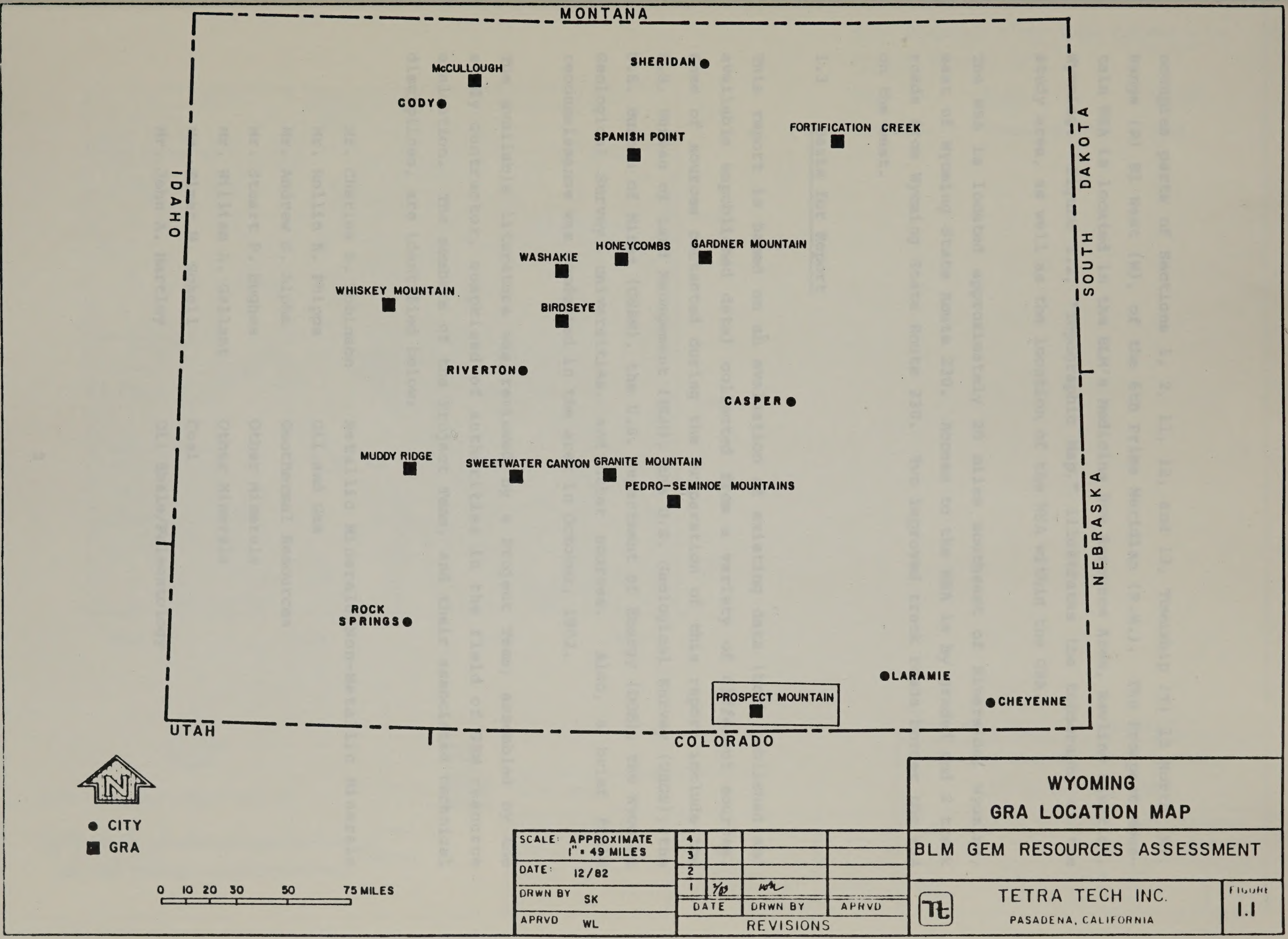
The U.S. Bureau of Land Management (BLM) has adopted a two-phase procedure for the integration of geologic, energy, and mineral (GEM) resources data for suitable/nonsuitable decisions concerning Wilderness Study Areas (WSAs). Phase I consists of a review and evaluation of existing data, resulting in an interpretation of the GEM resource potential of the WSAs. Phase II is designed to generate only the additional data required to support the GEM resource recommendations presented during Phase I. To facilitate this review, certain WSAs with similar geologic environments and mineral characteristics have been grouped together into larger GEM Resource Areas (GRA). Using these guidelines, the Prospect Mountain WSA was combined into the larger Prospect Mountain GRA. This report, which terminates the Phase I activities for the Prospect Mountain GRA, is an evaluation and interpretation of existing data concerning the GEM resource potential in the Prospect Mountain WSA.

The GEM resource evaluations for this study were performed by Tetra Tech, Inc. for the U.S. Bureau of Land Management, under Solicitation No. YA-553-CT2-1055. This study was completed in August, 1983.

1.2 Location and Access

This GEM report covers the area identified as the Prospect Mountain GEM Resource Area (GRA); the geographic location of the study area is shown in Figure 1.1, "GRA Location Map."

The Prospect Mountain GRA contains one WSA, the Prospect Mountain WSA (WY-030-303). The Prospect Mountain WSA contains approximately 1,099 acres, and is located between 41° 5' and 41° 8' north latitude and between 106° 26' and 106° 27' 30" west longitude, Carbon County, Wyoming. The Prospect Mountain WSA



WYOMING
GRA LOCATION MAP

BLM GEM RESOURCES ASSESSMENT

TETRA TECH INC.
PASADENA, CALIFORNIA

Figure 1.1

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occupies parts of Sections 1, 2, 11, 12, and 13, Township (T) 13 North (N), Range (R) 81 West (W), of the 6th Prime Meridian (P.M.). The Prospect Mountain WSA is located in the BLM's Medicine Bow Resource Area, Rawlins District, Wyoming. Figure 1.2, "Topographic Map," illustrates the topography of the study area, as well as the location of the WSA within the GRA.

The WSA is located approximately 20 miles southeast of Riverside, Wyoming, east of Wyoming State Route 230. Access to the WSA is by graded and 2 track roads from Wyoming State Route 230. Two improved track roads border the WSA on the west.

1.3 Basis for Report

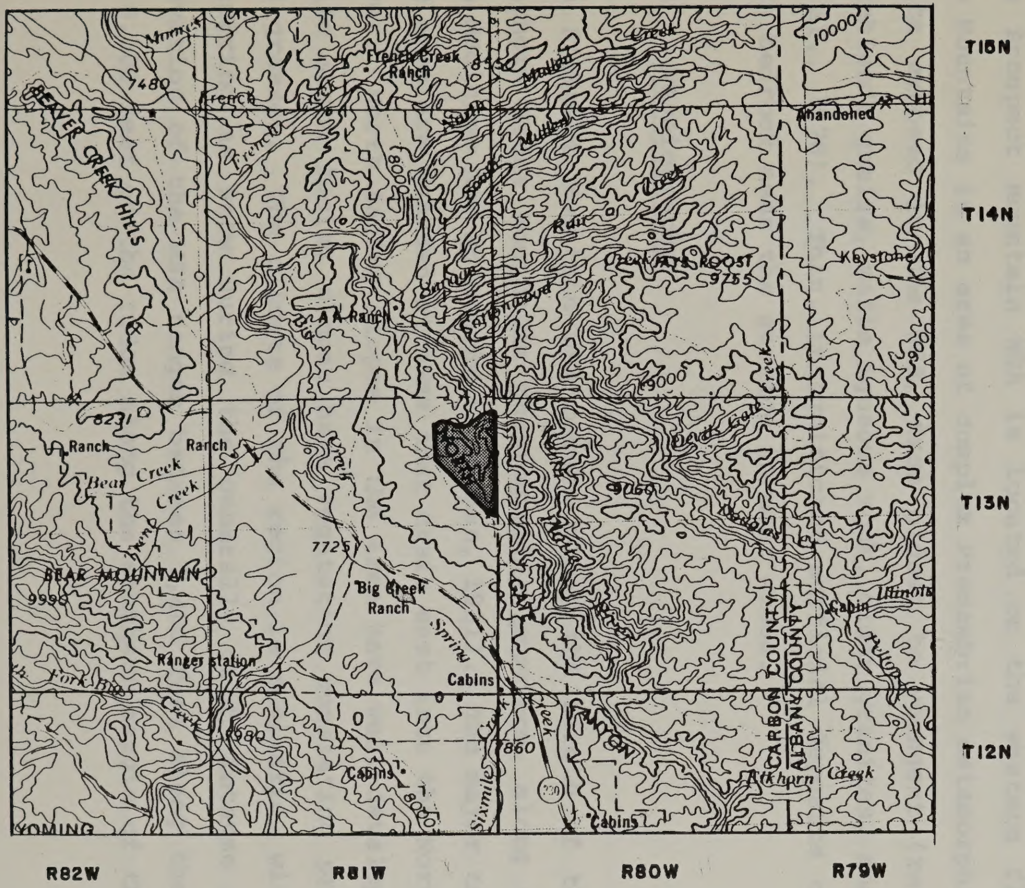
This report is based on an evaluation of existing data (both published and available unpublished data) collected from a variety of different sources. Some of sources contacted during the preparation of this report include the U.S. Bureau of Land Management (BLM), the U.S. Geological Survey (USGS), the U.S. Bureau of Mines (USBM), the U.S. Department of Energy (DOE), the Wyoming Geological Survey, universities, and other sources. Also, a brief field reconnaissance was conducted in the area in October, 1982.

The available literature was reviewed by a Project Team, assembled by the study contractor, comprised of authorities in the field of GEM resource evaluation. The members of the Project Team, and their associated technical disciplines, are identified below:

Mr. Charles S. Robinson	Metallic Minerals/Non-Metallic Minerals
Mr. Rollin E. Phipps	Oil and Gas
Mr. Andrew G. Alpha	Geothermal Resources
Mr. Stuart P. Hughes	Other Minerals
Mr. William A. Gallant	Other Minerals
Mr. Elmer M. Schell	Coal
Mr. John A. Hartley	Oil Shale/Paleontology

BLM Wilderness Study Areas Included in the Prospect Mountain GRA

WSA	NAME	ACREAGE
030-303	Prospect Mountain	1,099



(USGS, 1954; limited revision, 1962)

NOTE: Contours In 200 ft Interval

5 4 3 2 1 0 3 6 Miles

5 4 3 2 1 0 5 10 Kilometers

▨ Approximate Boundary of Wilderness Study Area

Prospect Mountain GRA, Wyoming

TOPOGRAPHIC MAP

BLM GEM RESOURCES ASSESSMENT

REGION 6 WYOMING and MONTANA

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PASADENA, CALIFORNIA

FIGURE 1.2

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2.0 GEOLOGY

The bedrock geology of the Prospect Mountain WSA consists of a series of Precambrian (> 600 million years before present [m.y.B.P.]) metamorphic rock-types common to the Medicine Bow Mountains where the WSA is located. Reconnaissance geologic mapping of the area was performed by Houston et al. (1978); this map is the best geologic map presently available for the area (see Figure 2.1). This map, together with the brief field reconnaissance and other available data included in the references and bibliography section of this report, and a brief field reconnaissance, form the basis for certain conclusions regarding GEM resources in the study area.

2.1 General

The Prospect Mountain WSA is located on the western flank of the Medicine Bow Mountains in an area of complex Precambrian metamorphic terrain. The rock units exposed in the WSA, from oldest to youngest (relative age), include hornblende gneiss, mafic igneous rock, older granites, and pegmatites (Houston et al., 1978). Thin, insignificant surficial deposits occur within the WSA, with bedrock near the surface in most areas.

2.2 Physiography

The Prospect Mountain WSA occurs along the margin of the Wyoming Basin and Southern Rocky Mountains physiographic province, along the western flank of the Medicine Bow Mountains (Fenneman, 1931). The major tributary drainages in the area are unnamed streams that drain east into the North Fork of the Platte River. North facing slopes in the area have well developed stands of timber, while south facing slopes have vegetation consisting primarily of sagebrush and grasses. The climate of the region is semi-arid, with most precipitation occurring as snow during the generally cold, intense winter months. The elevation of the WSA ranges between 7,400 feet along the North Platte River, to 8,500 feet on the ridge along the southern margin of the WSA.

2.3 Geologic Units

The geologic units exposed within the Prospect Mountain WSA consist of Precambrian metasedimentary and metaigneous rocks. Figure 2.1, "Geologic Map," delineates the geologic formations that occur throughout the GRA. Figure 2.2, "Generalized Stratigraphic Column," is a generalized stratigraphic column which gives a brief description of all the stratigraphic units that underlie the Prospect Mountain WSA.

2.3.1 Bedrock Units

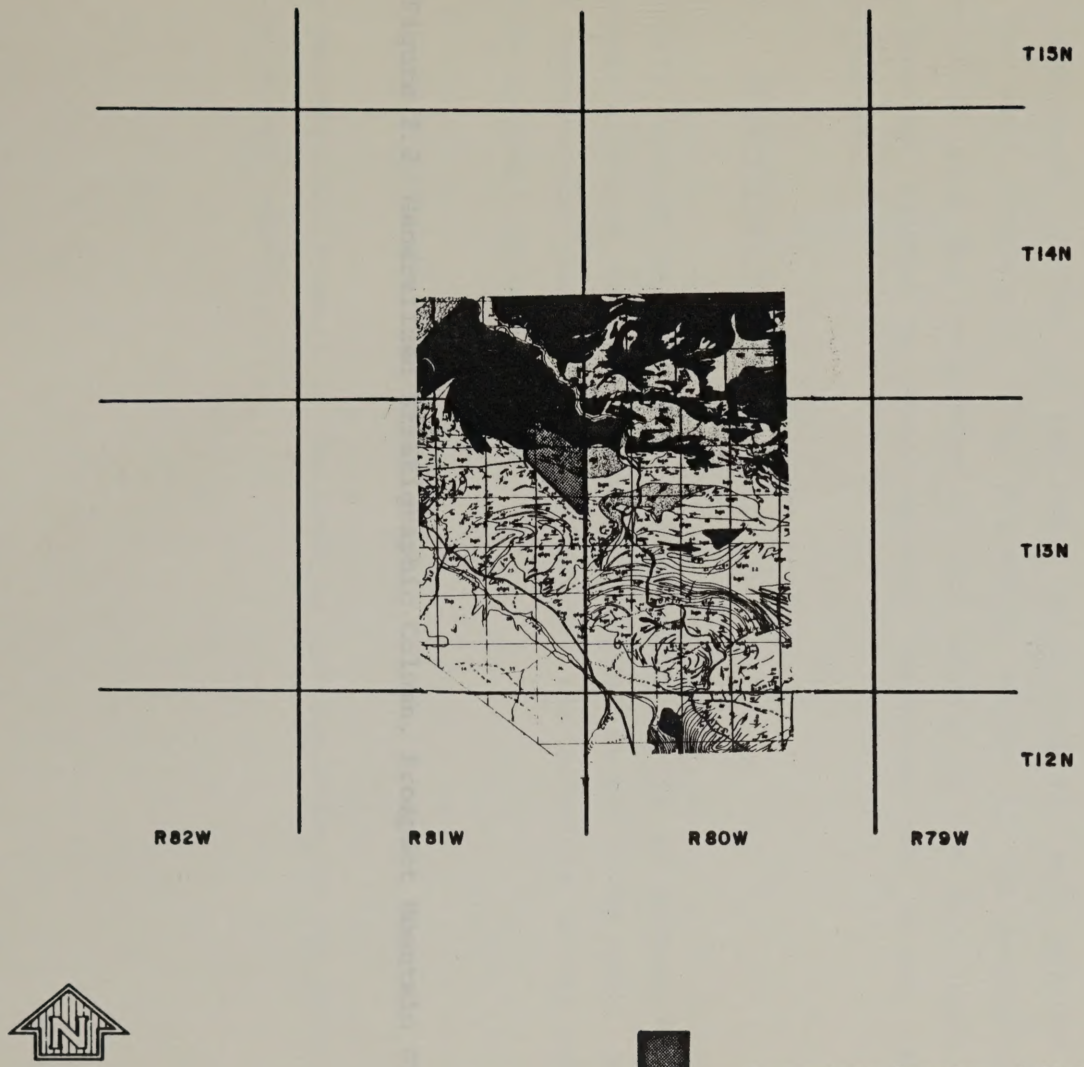
Hornblende gneiss underlies the southern third of the WSA; it is a generalized rock type used to describe a wide variety of rocks whose predominant rock type is hornblende gneiss, but that also contain rocks with different textures and compositional changes. The detailed distribution of these different rock types is not known at present, but some differences that have been identified in this unit include fine and coarse layered hornblende gneisses, amphibolites, biotite and sillimanite biotite gneisses, diopsidic gneiss, calc-biotite gneiss, and marble.

The mafic igneous rocks, which appear to be younger in relative age than the hornblende gneiss, are part of what is known locally as the Mullen Creek mafic complex. Olivine gabbro has been identified as the mafic rock that underlies Prospect Mountain. In general, the complex is mafic in composition, but numerous rock types are present that have not been mapped. The rock types recognized at present include metabasalt, olivine gabbro, gabbro, diorite, and quartz diorite.

The older granite has intruded or assimilated the adjacent rocks and underlies much of the middle third of the WSA; this older granite is known locally as the Prospect Mountain Granite. The Prospect Mountain Granite has been shown to intrude the mafic rocks, developing a poor to well developed foliation. The granite consists of quartz, and potash feldspar with other minor minerals.

BLM Wilderness Study Areas Included in the Prospect Mountain GRA

WSA	NAME	ACREAGE
030-303	Prospect Mountain	1,099



▨ Approximate Boundary of Wilderness Study Area

(HOUSTON et al.,1978)

Prospect Mountain GRA, Wyoming

GEOLOGIC MAP

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TETRA TECH INC.
PASADENA, CALIFORNIA

FIGURE 2.1

SYSTEM	SYMBOL	FORMATION	GENERAL LITHOLOGIC DESCRIPTION
PRECAMBRIAN	pЄgr	Granites	Pink medium-grained granite
	pЄl	Intrusives	Mafic igneous rocks ranging from well foliated orthamphibolite to little altered massive igneous rocks (i.e. Maffic Gabro)
	pЄg		Granite and Quartz Monzonite
	pЄgn	Gneiss	Augen, quartzo-feldspathic, biotite and hornblend

Figure 2.2 Generalized Stratigraphic Column, Prospect Mountain GRA

The youngest rocks of the area are pegmatites. They are generally comformable to the foliation, rarely over 10 feet wide, but may extend more than 1/2 mile in length. They are commonly composed of quartz, microcline, and plagioclase, with muscovite, ilmenite, magnetite, garnet and biotite as accessory minerals. Pegmatites are conformable with cross cutting relationships to the foliation. The pegmatites rarely contain tourmaline, fluorite, monzonite, allanite, euxenite or columbite which are the primary economic minerals mined in the past; these resources seem to be restricted to the pegmatites with cross cutting relationships. This rock has been dated at 1.6 billion years, correlating to a regional metamorphic event that enriched many granite rocks in radiogenic materials. Several other pegmatite types also occur in the area but are mineralogically similar to the first type.

2.4 Structural Geology

The structural geology of the area, aside from the well defined foliation, is not well understood. The discordant nature of the pegmatites that is associated with the occurrence of rare earths is the only known structural implications related to known mineral resources that affect the Prospect Mountain WSA.

2.5 Engineering Geology

Rockfall hazards may occur in areas where cliffs of Precambrian rock are exposed, although these areas are very limited in the study area. Road design and construction should take into account the foliation of the rock mass to reduce rockfall hazards in cuts.

2.6 Paleontologic Resources

The geologic environment of the area is not conducive to the preservation of paleontologic remains.

2.7 Historical Geology

Potential mineral resources of the area are primary in nature, that is, they would be part of the crystallized mass of rock. The time sequence of crystallization of the metaigneous and metamorphic rocks is not well known and is based primarily on field relationships. The hornblende gneiss is the oldest rock exposed within the WSA and is the host for the later intruded mineralized pegmatites. The mafic igneous rocks of Prospect Mountain were intruded next. This unit may contain strategic minerals (nickel, chrome, platinum group metals, etc.). Very little is known about the unit and it has not been mapped in detail. The older granite has intruded and assimilated the older rocks in part and is very low in radiogenic components (field verification). The pegmatites are the youngest rocks in the area. They intrude all the older rocks but are primarily found in the hornblende gneiss because of its well developed foliation. They were intruded about 1.6 billion years ago and are the units that contain much of the known mineralization in the area (i.e. uranium and rare earths).

3.0 ENERGY AND MINERAL RESOURCES

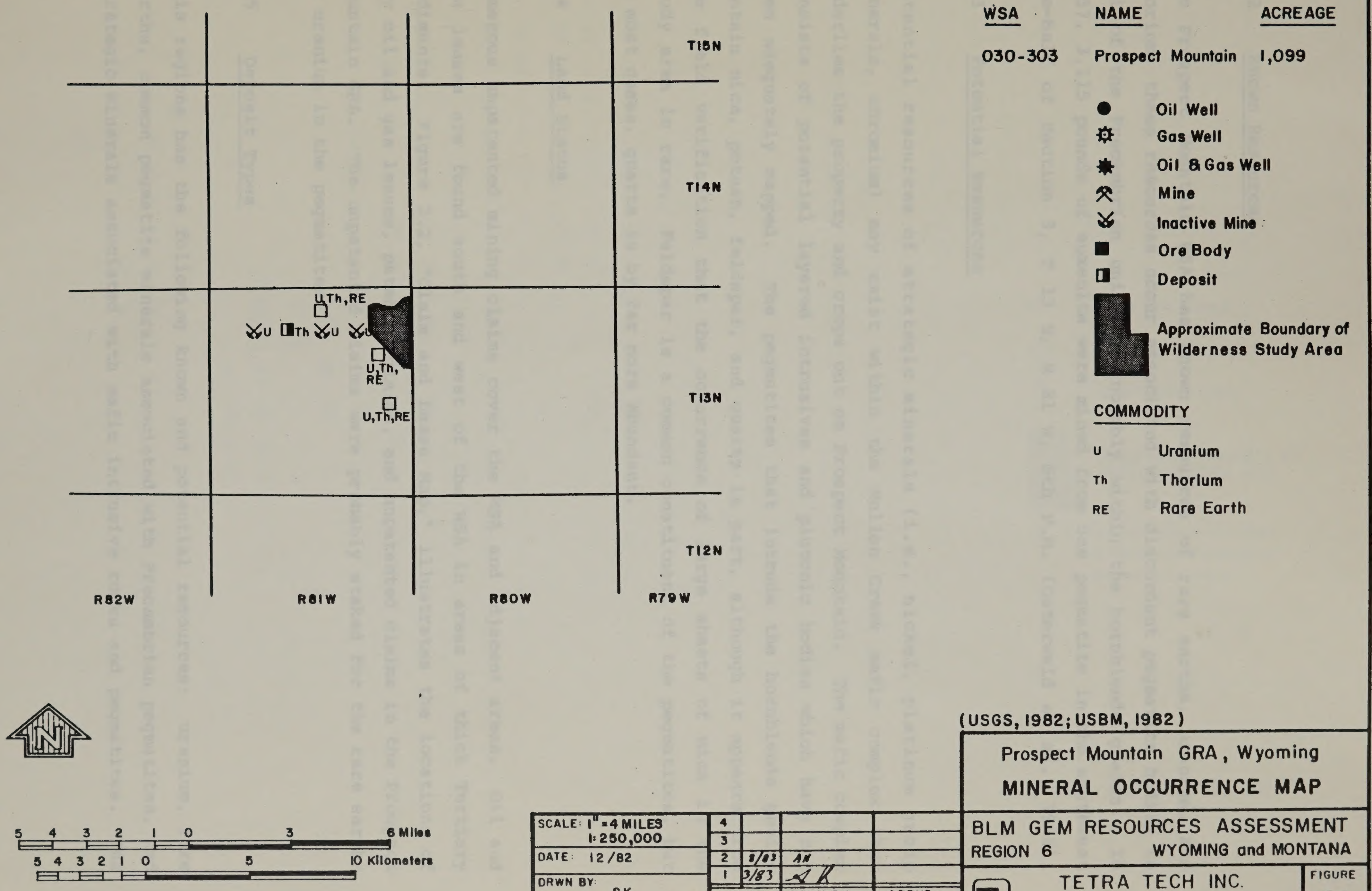
3.1 General

The Prospect Mountain WSA has been identified as having potential occurrences of the following GEM resources: strategic minerals, rare earths, uranium, thorium, and pegmatite minerals.

Figure 3.1, "Mineral Occurrence Map," illustrates the presence of any known past and present mine locations, or occurrences of mineral deposits and GEM resources within the GRA. Information for this figure came from the USGS' Computerized Resource Information Bank (CRIB); the USBM's Minerals Availability System (MILS); and a brief field reconnaissance conducted in October, 1982.

BLM Wilderness Study Areas Included in the Prospect Mountain GRA

WSA	NAME	ACREAGE
030-303	Prospect Mountain	1,099



(USGS, 1982; USBM, 1982)

Prospect Mountain GRA, Wyoming

MINERAL OCCURRENCE MAP

BLM GEM RESOURCES ASSESSMENT

REGION 6 WYOMING and MONTANA

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PASADENA, CALIFORNIA

FIGURE 3.1

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3.2 Known Resources

The Prospect Mountain WSA has known resources of rare earths, uranium, and thorium; these resources occur associated with discordant pegmatite bodies in all of the Precambrian units but notably within the hornblende gneiss. In 1957, 3,115 pounds of euxenite were mined from one pegmatite in the southwest one-half of Section 3, T 13 N, R 81 W, 6th P.M. (Osterwald et al., 1966).

3.3 Potential Resources

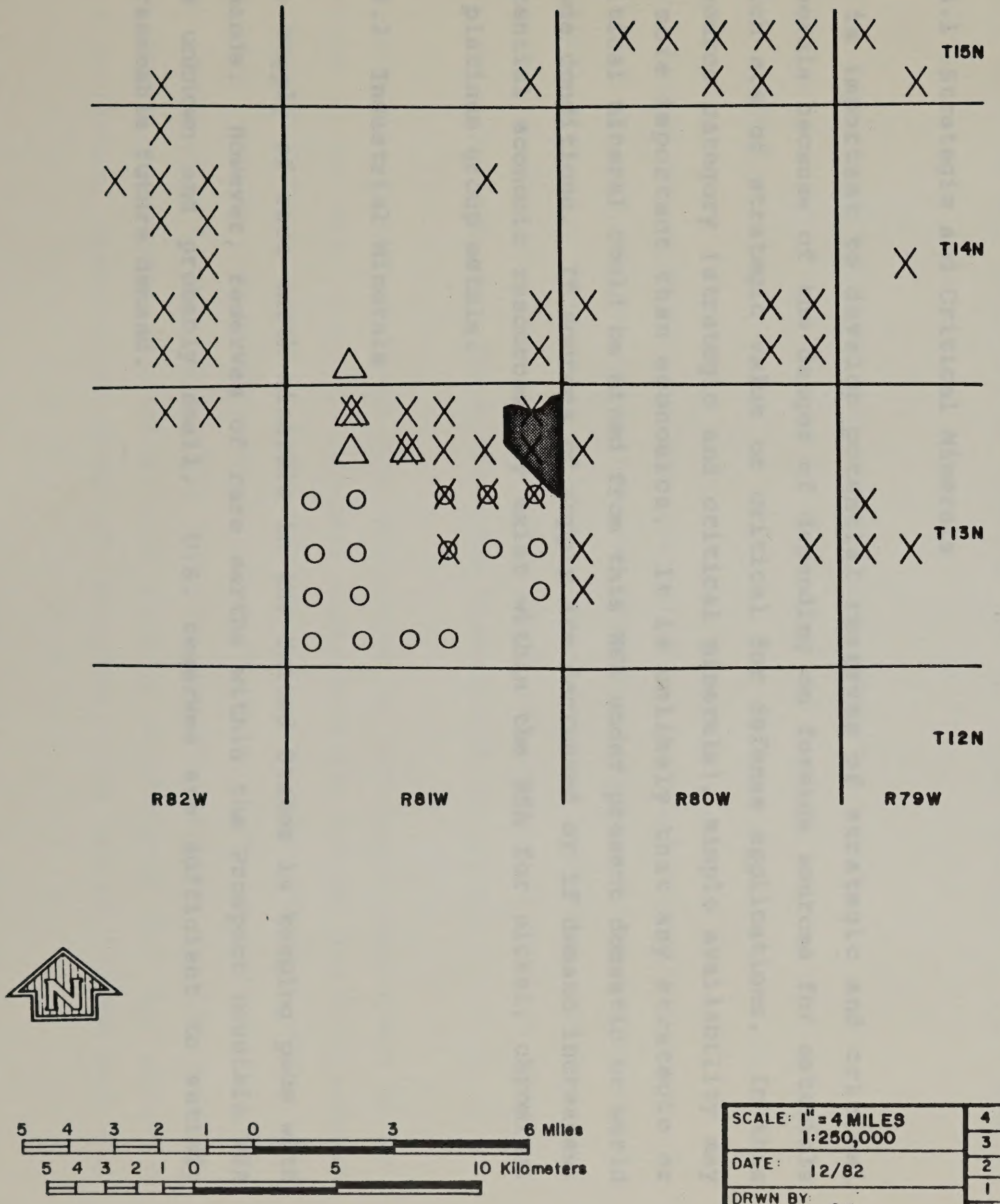
Potential resources of strategic minerals (i.e., nickel, platinum group minerals, chromium) may exist within the Mullen Creek mafic complex that underlies the property and crops out on Prospect Mountain. The mafic complex consists of potential layered intrusives and plutonic bodies which have not been adequately mapped. The pegmatites that intrude the hornblende gneiss contain mica, potash, feldspar, and quartz in part, although it appears from the field verification that the occurrence of large sheets of mica in the study area is rare. Feldspar is a common constituent of the pegmatites, but in most cases, quartz is by far more abundant.

3.4 Land Status

Numerous unpatented mining claims cover the WSA and adjacent areas. Oil and gas leases are found south and west of the WSA in areas of thick Tertiary sediments. Figure 3.2, "Claim and Lease Map," illustrates the locations of any oil and gas leases, patented claims, and unpatented claims in the Prospect Mountain GRA. The unpatented claims were probably staked for the rare earths or uranium in the pegmatites.

3.5 Deposit Types

This regions has the following known and potential resources: uranium, rare earths, common pegmatite minerals associated with Precambrian pegmatites, and strategic minerals associated with mafic intrusive rocks and pegmatites. The



BLM Wilderness Study Areas Included in the Prospect Mountain GRA

WSA	NAME	ACREAGE
030-303	Prospect Mountain	1,099

○	Oil & Gas Lease
△	Patented Claim
X	Unpatented Claim
▨	Approximate Boundary of Wilderness Study Area

NOTE: Symbols illustrate those sections where claims or leases are present

(BLM, 1982)

Prospect Mountain GRA, Wyoming

CLAIM and LEASE MAP

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BLM GEM RESOURCES ASSESSMENT
REGION 6 WYOMING and MONTANA

TETRA TECH INC.
PASADENA, CALIFORNIA

FIGURE 3.2

pegmatites were emplaced about 1.6 billion years ago during a regional metamorphic event which increased the radiogenic content of large areas of Wyoming. The pegmatites, which were crystallized late in the magma cooling process, concentrated elements such as thorium, niobium, yttrium, columbium, and uranium in minerals such as euxenite, monazite, columbite, allanite, and samarskite (Houston et al., 1978; Osterwald et al., 1966).

Strategic metals (nickel, chromium, and platinum group minerals) may occur in the study area as disseminations, or as beds or veins within layered mafic intrusives of the Mullen Creek mafic complex. Very little information is available on the detailed geology of the Mullen Creek mafic complex, but from what is available, it seems likely that potential occurrences of these elements would be present.

3.6 Resource Economics

3.6.1 Strategic and Critical Minerals

It is important to develop potential reserves of strategic and critical minerals because of the danger of depending on foreign sources for materials which are of strategic value or critical for defense applications. In this resource category (strategic and critical minerals), simple availability may be more important than economics. It is unlikely that any strategic or critical mineral could be mined from this WSA under present domestic or world trade conditions. If sources of supply are decreased or if demand increases, potential economic resources may exist within the WSA for nickel, chromium, or platinum group metals.

3.6.2 Industrial Minerals

The supply of rare earth minerals in the United States is keeping pace with demands. However, reserves of rare earths within the Prospect Mountain WSA are unknown and probably small. U.S. reserves are sufficient to satisfy foreseeable future demand.

3.6.3 Uranium

The current price of uranium (approximately $17 per pound in October, 1982) is low enough to discourage additional mining and exploration. A turnaround in national nuclear policy will be necessary to return the industry to profitability. Reserves far exceed demand at present and numerous mines with significant measured reserves of U_3O_8 have closed due to lack of demand. When and if nuclear policy and attitudes change, the uranium industry will recover but probably not to the extent of the 1970s.

3.6.4 Thorium

Thorium, like many of the rare earth elements, is concentrated commonly in accessory minerals, primarily monayite. It is estimated that in 1983, U.S. consumption of thorium will be approximately 35 tons (ThO_2 equivalent), which will be met entirely by imports and existing government and industry stocks.

4.0 LAND CLASSIFICATION FOR GEM RESOURCE POTENTIAL

4.1 General

The Prospect Mountain WSA has been classified as having a moderate favorability based on indirect evidence for the potential occurrence of strategic and critical minerals, industrial minerals, rare earths, pegmatite minerals, and uranium and thorium. All other commodities are considered to have very low favorability based upon the information known about the area.

In order to better evaluate the occurrence or potential occurrence of resources in the GRA, a 2-part resource classification scheme has been adopted as requested by contract. Each resource or potential resource within the GRA will receive an alpha-numeric classification. The number designation will range from 1 to 4, and will indicate the favorability of the geologic environment, geologic processes, and mineral occurrences for the presence of a particular resource or group of resources. The letter designation will

range from A to D, and will indicate the level of confidence to be associated with the numerical designation. Figure 4.1, "Land Classification Map," illustrates the areas of potential GEM resources with their assigned classifications for the WSAs within the Prospect Mountain GRA. Figure 4.2, "Resource Classification Scheme," provides a detailed description of the number and letter designations used in the resource classification scheme.

4.2 Strategic Minerals

The Prospect Mountain WSA is considered to have a moderate favorability based on indirect evidence for the potential occurrence of strategic minerals in the Mullen Creek mafic complex, and the pegmatite rich areas in the hornblende gneiss (classified 3B). This classification is based upon past production in pegmatites, and occurrences of strategic minerals in other areas with a similar geologic environment.

4.3 Industrial Minerals

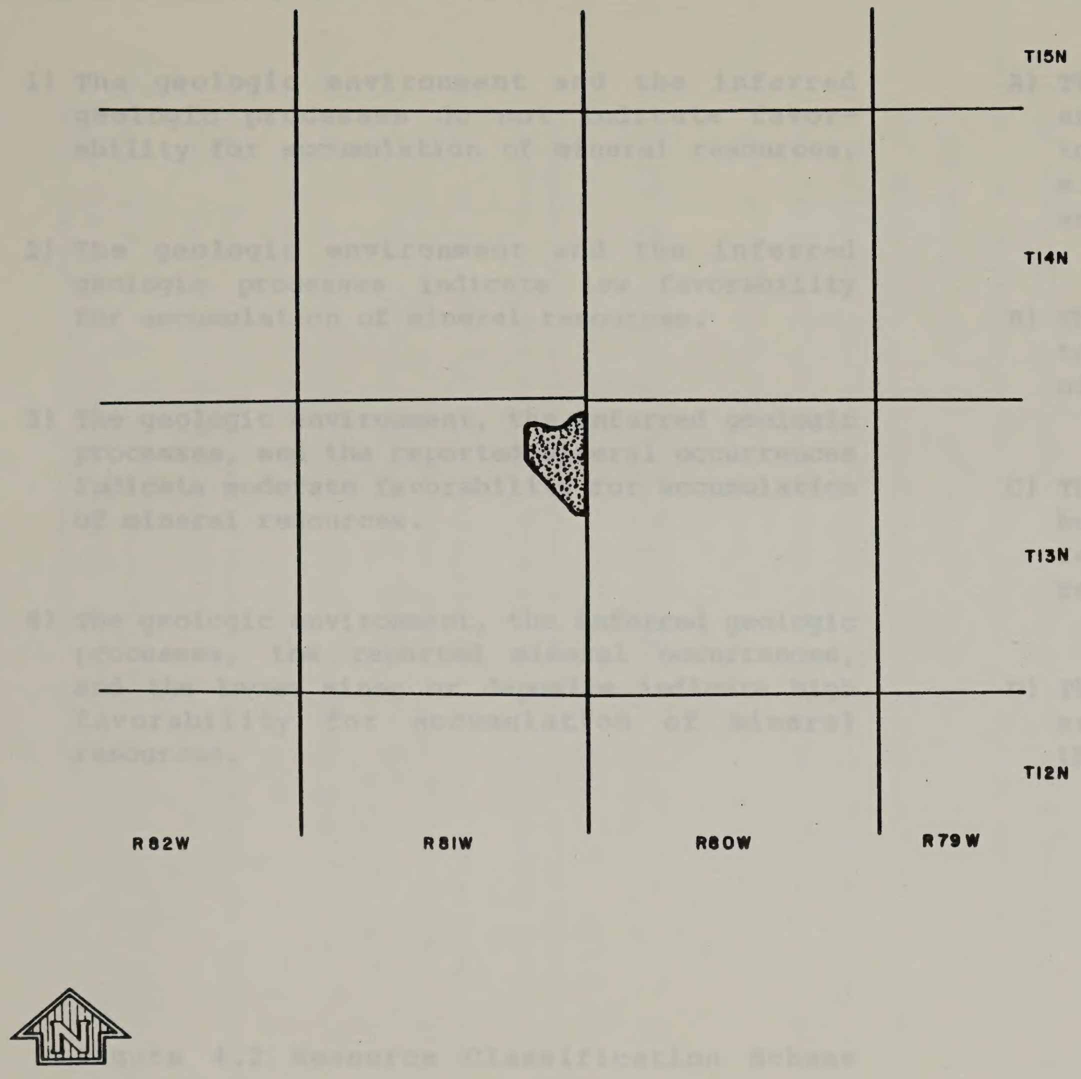
The entire Prospect Mountain WSA is considered to have a moderate favorability based on direct but quantitatively minimal evidence for the potential occurrence of rare earths (classified 3C); this classification is based upon known production in the same geologic environments adjacent to the WSA and from the brief field reconnaissance.

4.4 Uranium and Thorium

The entire WSA is considered to have a moderate favorability based on direct but quantitatively minimal evidence for the potential occurrence of uranium and thorium (classified 3C); this classification is based upon known occurrences in the GRA, the brief field reconnaissance, and rare earth production in similar geologic environments in the region.

4.5 Pegmatite Minerals

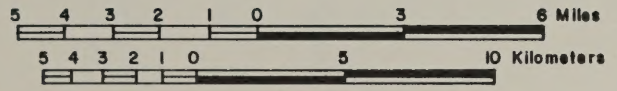
The entire WSA is considered to have a low favorability for the potential occurrence of pegmatite (quartz and feldspar) minerals (classified 3C); this



BLM Wilderness Study Areas Included in the Prospect Mountain GRA

WSA	NAME	ACREAGE
030-303	Prospect Mountain	1,099

SYMBOL	GEM RESOURCE	CLASSIFICATION
▨	Uranium & Thorium	3C
	Strategic & Critical Minerals	3B
	Rare Earth	3C
	Pegmatite Minerals	3C
	Other GEM Resources	2C
☐	Approximate Boundary of Wilderness Study Area	



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Prospect Mountain GRA, Wyoming

LAND CLASSIFICATION MAP

BLM GEM RESOURCES ASSESSMENT
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FIGURE 4.1

Numerical Classification Scheme

1) The geologic environment and the inferred geologic processes do not indicate favorability for accumulation of mineral resources.

2) The geologic environment and the inferred geologic processes indicate low favorability for accumulation of mineral resources.

3) The geologic environment, the inferred geologic processes, and the reported mineral occurrences indicate moderate favorability for accumulation of mineral resources.

4) The geologic environment, the inferred geologic processes, the reported mineral occurrences, and the known mines or deposits indicate high favorability for accumulation of mineral resources.

Letter Classification Scheme (Level of Confidence)

A) The available data are either insufficient and/or cannot be considered as direct evidence to support or refute the possible existence of mineral resources within the respective area.

B) The available data provide indirect evidence to support or refute the possible existence of mineral resources.

C) The available data provide direct evidence, but are quantitatively minimal to support or refute the possible existence of mineral resources.

D) The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

Figure 4.2 Resource Classification Scheme

classification is based on direct, but quantitatively minimal evidence, and on the brief field reconnaissance.

4.6 Other GEM Resources

There exists quantitatively minimal direct evidence to support a low favorability classification for the potential occurrence of other GEM resources in the WSA (classified 2C). This classification is based in part on the geologic environment and inferred geologic processes that have been identified within the WSA.

5.0 RECOMMENDATIONS FOR FURTHER WORK

5.1 Work Recommended to Complete Data Base

A number of investigations could be implemented to generate additional data to supplement the conclusions of this Phase I report for the Prospect Mountain GRA. The pegmatites should be mapped at a large scale so that an identification of the favorable characteristics based upon geologic information can be made. In addition, the mafic rocks of Prospect Mountain need to be mapped and sampled in detail to determine the favorability for the occurrence of strategic and critical minerals.

6.0 REFERENCES AND SELECTED BIBLIOGRAPHY

1. Atomic Energy Commission, Division of Raw Material. 1950-58. Preliminary Reconnaissance Reports on Reported Occurrences of Uranium Deposits, Carbon County, Wyoming. U.S. Geological Survey.

2. Bateman, A.F., Jr. et al. Leasable Mineral and Waterpower Land Classification Map of the Rawlins Quadrangle, Wyoming, Colorado. U.S. Geological Survey, Open File Report 80-143.

3. Dribus, J.R. and Nanna, R.F. 1982. Rawlins Quadrangle. U.S. Department of Energy, PGJ/F-019 (82).

4. Fenneman, N.M. 1931. Physiography of the Western United States. New York: McGraw-Hill Book Company.

5. Houston, R.S. et al. 1977. Geologic Map of the Sierra Madre and Western Medicine Bow Mountains, Southeastern Wyoming. U.S. Geological Survey, Miscellaneous Field Studies Map No. MF-827.

6. Houston, R.S. et al. 1978. A Regional Study of Rocks of Precambrian Age in that Part of the Medicine Bow Mountains Lying in Southeastern Wyoming--with a Chapter on the Relationship between Precambrian and Laramide Structure. Geological Survey of Wyoming, Memoir 1.

7. Intrasearch. 1981. Geologic Map of the Rawlins Quadrangle. U.S. Department of Energy.

8. Karlstrom, K.E. 1981. Late Archean and Early Proterozoic Geologic History of Metasedimentary Rocks of the Medicine Bow Mountains, Wyoming. Dissertation Abstracts International.

9. Magleby, D.N. et al. 1954. Airborne Radiometric Survey of the Browns Park Formation, Carbon County, Wyoming. Atomic Energy Commission, Division of Raw Materials, Report No. RME-1055 (Rev.).

10. Matus, I. 1958. Geologic Map of Lower French Creek Area, Carbon County, Wyoming. University of Wyoming Thesis.

11. Ormond, A. 1957. Preliminary Report on the Geology of Uranium Deposits in the Brown Park Formation in Moffat County, Colorado and Carbon County, Wyoming. Bendix Field Engineering Corporation, Report No. TM-D-1-18.

12. Osterwald, F.W. et al. 1966. Mineral Resources of Wyoming. Geological Survey of Wyoming, Bulletin 50.

13. Shannon, S.S., Jr. et al. 1981. Detailed Uranium Geochemical Stream Sediment Survey Data Release for Selected Portions of the Craig NTMS Quadrangle, Colorado, and Rawlins NTMS Quadrangle, Wyoming, including Concentrations of Forty-five Additional Elements. Department of Energy Open Files, GJBX-216 (81).

14. Ugolini, F., National Park Service. Personal Communication. November 1982. List of National Registry of National Landmarks, (List of Geologic Features Designated as National Landmarks); and List of Recommended Geologic Features in Natural History Theme Studies for Montana (updated December 1981) and Wyoming (updated March 1981).

15. U.S. Bureau of Land Management. 1982. Master Title Plats. Plats for the study area were supplied to Teta Tech by the U.S. Bureau of Land Management in August, 1982.

16. U.S. Bureau of Mines. 1982. Minerals Availability System (MILS). Deposit Listing. Listings for the study area were supplied to Tetra Tech by the U.S. Bureau of Mines in August, 1982.

17. U.S. Geological Survey. 1954; limited revision, 1962. Rawlins 1° x 2° Topographic Quadrangle, scale 1:250,000, contour interval 200 feet, Rawlins, Wyoming; Colorado, NK 13-7, Series V502.

18. U.S. Geological Survey. 1982. Computerized Resource Information Bank (CRIB) Mineral Resources Files. Files for the study area were supplied to Tetra Tech by the U.S. Bureau of Land Management in August, 1982.